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German Herpetological Papers

Compiled by MRS. ROBERT BRANDT[1]

SCHLANGEN. C. Stemmler-Morath. Gute Schriften, Basel, No. 213, July 1942.

An excellent popular treatise on Swiss snakes, and snakes of different parts of the world. Author tries to combat superstition and unnecessary fear. He states that no European snake, poisonous or harmless, is aggressive enough to attack people without being forced to do so. Of our American snakes only crotalus and micrurus are mentioned, and the fact emphasized that more people die in the U.S.A. from the bite of the more harmless coral snake than from rattler bites, because crotalus is well known for its dangerousness and micrurus is often mistaken for lampropeltis.

* * *

Beobachtungen an der Vierstreifennatter (Elaphe quatuorlineata quatuorlineata /Lacépède/) Carl Stemmler-Morath. Wochenschr. für Aquarien-und Terrarienkunde 1940, Heft 41 and 43.

Though the female Elaphe qu.quatuorlineata does not incubate her eggs as for instance the python does, she is the only European snake who keeps a sort of watch over her eggs for a few days by coiling around them.

* * *

Uber Sexualdimorphismus bei Malaiischen Schlangen. Dr. Felix Kopstein. Leiden, E. J. Brill, 1941.

99 charts on the sex difference in Malayan snakes. Author arrives at the conclusion that the study of series shows difference in both sexes; but there are very few signs to determine the sex in a single individual.

* * *

Uber die Schwarze Kreuzotter; von einem Neuen Fundort in der Schweiz. Carl Stemmler-Morath. Wochenschrift für Aquarien-und Terrarienkunde 1943, Heft 5.

An interesting account on the melanotic forms of the alpine adders. Author does not agree with the opinion of other writers that melanism is caused by the stronger sun of high mountain regions, because many black specimens are found in flat countryside. Author thinks melanism might be connected with the innersecretoric glands. Though melanism is hereditary, author dissected one completely black female whose intrauterin young were normally colored.

---

[1]Mrs. Robert (Leonore) Brandt has kindly consented to write abstracts of recent German herpetology.

Size of adult *Eurycea l. longicauda* (Green)

By DOYT EMORY LADD

Bishop (1941) based data on average length of *Eurycea l. longicauda* on a series of 9 males and 5 females from a single locality. This study is based on specimens from 10 localities, and a series of 29 males and 30 females. It is hoped that averages based on longer series will be more representative of the characteristics of the species.

Measurements of *Eurycea l. longicauda* (in mm.):

	Sex	*No. Spec.*	*Extremes*	*Average*
Total length				
	♂	29	45.0-150.0	102.6
	♀	30	80.5-173.0	128.4
Tail length				
	♂	29	22.5- 93.0	60.2
	♀	30	46.0-114.0	78.4
Tail/total				
	♂	29	? - ?	58.7
	♀	30	? - ?	61.1

Specimens from 8 localities including 54 specimens were collected over a wide range in Miami Valley, Ohio. Bishop (1941) found average total length in males and females, respectively, of 102.6 and 133.3 mm. These figures indicate that the species in central New York State is consistent in average size with the species in southwestern Ohio.

Feeding Habits of *Gerrhonotus*

By A. K. CHRISTENSON, U.S.M.C.

On the 13th of April, 1947, while on a field trip into the hills of southern Camp Pendleton, near Oceanside, California, I found a dead *Gerrhonotus multicarinatus webbii* Baird which had the body of a sand cricket, genus *Stenopelmatus,* protruding from its mouth. It was obvious that the lizard had choked to death while trying to swallow the insect. Apparently, the legs of the insect were the factors which kept the lizard from either swallowing or releasing its prey. The powerful, outstretched, hind legs prevented swallowing, and it is probable that the spreading of the anterior and middle pairs of legs caused the tibial spurs to lodge in the lizard's throat, preventing release. It is possible that the insect, with its formidable jaws, may have grasped the inside of the throat of its attacker. Though the *Gerrhonotus* was a large specimen, the great size of the insect would have made the swallowing quite a task even without the interference of the hind legs. The pair was found at the edge of a dry creek bed.

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Preliminary Herpetological Survey of Montgomery County, Ohio

By JOHN THORNTON WOOD AND WILLIAM EDWARD DUELLMAN

There are few mentions in literature of the reptiles and amphibians of Montgomery County, Ohio. Conant (1938) lists 5 snakes and 2 turtles, Walker (1946) lists 3 frogs and toads, Wood (1946) lists 1 salamander, and Wood and Fitzmaurice (1947) list 1 salamander, a total of 12 species.

This report is based on specimens in the Dayton Public Library Museum (DPLM), as well as on the private collections of the authors. It contains locality and collection date reports on the 36 species now known from this area. The authors realize that a report of this type is never complete, but offer this as a basis for future additions, and as the first report to bring the list up to date.

1. *Necturus maculosus maculosus* (Rafinesque)
   Specimen caught by W. E. Duellman on a fish-hook baited with an earthworm in the Stillwater River below the spillway of Englewood Dam, Randolph Twp. on March 16, 1946. DPLM record from Miami River, Harrison Twp. July 20, 1941.
2. *Cryptobranchus alleganiensis* (Daudin)
   Miami River, Harrison Twp. No date (DPLM); Miami River, Butler Twp., Mid-summer 1938 (DPLM); Mad River, Dayton, June 20, 1939 (DPLM).
3. *Ambystoma jeffersonianum* (Green)
   Centerville, Washington Twp., March 18, 1946 (WED).
4. *Ambystoma maculatum* (Shaw)
   Sulfur Grove, Wayne Twp., March 6, 1945 (DPLM); Madison Twp., November 16, 1944 (DPLM).
5. *Desmognathus fuscus fuscus* (Rafinesque)
   Germantown Dam, German Twp. May 8, 1944 (DPLM).
6. *Plethodon cinereus cinereus* (Green)
   Murlin Heights, Butler Twp., 1942 (DPLM); Sunderland Falls, Butler Twp., April 18, 1944 (DPLM); Englewood Dam, Randolph Twp., April 6, 1946 (WED); Germantown Dam, German Twp., May 8, 1944 (DPLM).
7. *Plethodon richmondi* (Netting and Mittleman)
   Chambersburg Rd. quarry, Wayne Twp., August 21, 1944 (DPLM); Sunderland Falls, Butler Twp., April 18, 1944 (DPLM).
8. *Eurycea bislineata bislineata* (Green)
   Sunderland Falls, Butler Twp., April 18, 1944 (DPLM); Hills and Dales Park, Van Buren Twp., April 26, 1944 (DPLM); Germantown Dam, German Twp., May 8, 1944 (DPLM); Englewood Dam, Randolph Twp., March 16, 1946 (WED).
9. *Eurycea longicauda longicauda* (Green)
   Sunderland Falls, Butler Twp., April 18, 1944 (DPLM); Madison

Twp., October 7, 1942 (DPLM); Buttermilk Falls, Englewood, Randolph Twp., August 4, 1946 (JTW).

10. *Bufo americanus americanus* (Holbrook)
Germantown Dam, German Twp., May 8, 1944 (DPLM); Cricket Holler B.S.A. Camp, Butler Twp., June 15, 1943 (DPLM).

11. *Bufo woodhousii fowleri* Bailey and Bailey
Harrison Twp., October 3, 1942 (DPLM); Cricket Holler B.S.A. Camp, Butler Twp., August 12, 1942 (DPLM).

12. *Acris crepitans* Baird
Kuntz's Pond, Dayton, September 14, 1946 (WED); Miami River, Harrison Twp., April 25, 1944 (DPLM); Englewood Dam, Randolph Twp., June 3, 1944 (DPLM); Taylorsville Dam, Butler Twp., October 1, 1944 (DPLM).

13. *Rana catesbeiana* Shaw
Old Channel, Dayton, May 19, 1941 (DPLM).

14. *Rana clamitans* Latereille
Oakwood, May 19, 1945 (WED); Kuntz's Pond, Dayton, April 17, 1944 (DPLM).

15. *Rana palustris* Le Conte
Old Channel, Dayton, January 2, 1943 (DPLM); Taylorsville Dam, Butler Twp., August 4, 1946 (JTW).

16. *Rana pipiens* Schreber
Vandalia, Butler Twp., October 14, 1944 (DPLM); Northridge, Harrison Twp., August 4, 1946 (JTW); Kuntz's Pond, Dayton, September 14, 1946 (WED); Englewood Dam, Randolph Twp., April 7, 1946 (WED); Old Channel, Dayton, September 17, 1940 (DPLM).

17. *Eumeces fasciatus* (Linne)
Sunderland Falls, Butler Twp.; Summer 1944 (DPLM).

18. *Carphophis amoena helenae* (Kennicott)
Northridge, Harrison Twp., May 27, 1943 (DPLM).

19. *Diadophis punctatus edwardsii* (Merrem)
Germantown Dam, German Twp., May 8, 1944 (DPLM).

20. *Heterodon contortrix contortrix* (Linne)
Germantown, German Twp., October 6, 1942 (DPLM); Germantown Dam, German Twp., September 8, 1942 (DPLM).

21. *Coluber constrictor constrictor* (Linne)
(The zone of intergradation between this species and *C. c. flaviventris* falls across the county, but since specific designation is uncertain all specimens are classed for the present as *C. c. c.*).....
Englewood Dam, Randolph Twp., April 6, 1946 (WED); Stroop Rd., Van Buren Twp., October 24, 1946 (WED); Cricket Holler B.S.A. Camp, Butler Twp., March 24, 1945 (JTW); Old Channel, Dayton, 1940 (DPLM); Northridge, Harrison Twp., 1943 (JTW); Germantown Dam, German Twp., April 28, 1942 (DPLM); Jefferson Twp., September 11, 1942 (DPLM).

22. *Elaphe obsoleta obsoleta* (Say)
Northridge, Harrison Twp., October 14, 1944 (JTW); Shaker Pond, Butler Twp., June 2, 1943 (JTW); Cricket Holler B.S.A. Camp, Butler Twp., August 8, 1942 (DPLM); Pinnacle Rd., Miami Twp., December 6, 1946 D.O.R. (WED); Jefferson Twp., September 28, 1942 (DPLM); Hills and Dales Park, Van Buren Twp., April 10, 1943 (JTW).

23. *Lampropeltis triangulum triangulum* (Lacepede)
Madden Park, Van Buren Twp., June 10, 1940 (JTW); Englewood Dam, Randolph Twp., June 22, 1940 (DPLM); East Dayton, June 1940 (DPLM); Madison Twp., April 30, 1942 (JTW).

24. *Natrix kirtlandii* (Kennicott)
Belmont, Dayton, September 16, 1945 (WED).

25. *Natrix septemvittata* (Say)
Kuntz's Pond, Dayton, March 20, 1942 (DPLM); Germantown Dam, German Twp., September, 1945 (WED); Englewood Dam, Randolph Twp., June 18, 1940 (DPLM); Taylorsville Dam, Butler Twp., August 4, 1946 (JTW); Wolf Creek, Harrison Twp., May 30, 1944 (DPLM).

26. *Natrix sipedon sipedon* (Linne)
Englewood Dam, Randolph Twp., June 23, 1943 (DPLM); Dayton, August 26, 1940 (DPLM); Taylorsville Dam, Butler Twp., October 1, 1940 (DPLM); Wolf Creek, Madison Twp., May 30, 1944 (DPLM); Germantown Dam, German Twp., Sept., 1945 (WED); Northridge, Harrison Twp., May 2, 1940 (DPLM).

27. *Storeria dekayi* (Holbrook)
Webster St. Bridge, Dayton, April 24, 1941 (JTW); Belmont, Dayton, Sept. 16, 1945 DOR (WED); Oakwood, Van Buren Twp., September, 1942 (DPLM).

28. *Thamnophis butleri* (Cope)
Dayton (Ruthven 1908)

29. *Thamnophis sirtalis sirtalis* (Linne)
Englewood Dam, Randolph Twp., June 18, 1940 (DPLM); Old Channel, Dayton, June 13, 1943 (DPLM); Oakwood, Van Buren Twp., June 20, 1942 (DPLM); Northridge, Harrison Twp., Oct. 14, 1944 (JTW).

30. *Sistrurus catenatus catenatus* (Rafinesque)
Riverside, Mad River Twp., August 12, 1943 (DPLM).

31. *Sternotherus odoratus* (Latreille)
Old Channel, Dayton, April 14, 1941 (DPLM); Eastwood Pond, Dayton, April 16, 1941 (DPLM); Kuntz's Pond, Dayton, July 23, 1945 (WED); Englewood Dam, Randolph Twp., August 4, 1946 (JTW).

32. *Chelydra serpentina serpentina* (Linne)
Old Channel, Dayton, June 17, 1940 (JTW); Wolf Creek, Madison Twp., May 30, 1944 (DPLM); Dayton, Sept. 19, 1940 (JTW).

33. *Terrapene carolina* (Linne)
Germantown Dam, German Twp., July 10, 1942 (DPLM); Hills and Dales Park, Van Buren Twp., August, 1943 (JTW); Northridge, Harrison Twp., October 14, 1944 (JTW).

34. *Graptemys geographica* (Le Seuer)
Murlin Heights, Butler Twp., June, 1940 (JTW); Triangle Park, Dayton, August 12, 1943 (JTW); Wolf Creek, Madison Twp., May 23, 1944 (DPLM).

35. *Chrysemys bellii marginata* Agassiz
Old Channel, Dayton, June 8, 1940 (DPLM); Kuntz's Pond, Dayton, May 20, 1944 (DPLM); Englewood Dam, Randolph Twp., June 3, 1944 (DPLM); Northridge, Harrison Twp., August 4, 1946 (JTW).

36. *Amyda spinifera spinifera* (Le Seuer)
Triangle Park, Dayton, June 5, 1943 (JTW); Mad River, Dayton, June, 1943 (DPLM); Main St. Bridge, Dayton, June 10, 1944 (JTW).

Sistrurus in Michigan

By ALLEN R. ROBERTS AND JACK QUARTERS

While on a field trip on May 3, 1947, at Walled Lake, Oakland County, Michigan, ten *Sistrurus catenatus* were taken. This site is about thirty miles northwest of Detroit. It was a warm sunny day with the temperature about seventy degrees, and a light breeze was blowing. The area chosen was a sheltered, swampy spot about two hundred yards from the main road.

All of the rattlers were taken before noon, one of which was a melanistic specimen. Further examination of this specimen proved it to be a pregnant female measuring 28½ inches. The original blotched pattern was discernible for only a few inches behind the head on the upper part of the body, the rest being a satiny black color. It is being kept for further observation and since its capture has been feeding readily on white mice. We know of at least two other melanistic specimens taken at this location within the last two years.

The other specimens, with the exception of a young one, all measured over 24 inches. The young one, a male, measured only 11½ inches. The largest was 31¼, while the average length was 26½ inches, excluding the previously mentioned young specimen. Four of the ten captured were females. A female that was taken at the same spot on May 18, contained nine developing embryos.

Most of the specimens showed little fear, and did not even attempt to strike when pinned down. They were all caught while sunning themselves on the higher, dry clumps of grass in the swamp. Although this area has been gone over frequently by collectors, it has not diminished the abundance of these venomous reptiles.

Subspecies of the Sonoran Toad (*Bufo compactilis* Wiegmann)

By HOBART M. SMITH

The sonoran toads (*Bufo compactilis* auct.) have an extensive range including the area from central Mexico to northern Oklahoma and southern Nevada. Examination of specimens and descriptions indicates that at least two forms are involved, here tentatively regarded as subspecies.

Bufo compactilis compactilis Wiegmann

Southern Sonoran Toad

Bufo compactilis Wiegmann, Isis von Oken, vol. 26, pt. 7, 1833, pp. 661-662 (type locality "Mexico").

Bufo anomalus Gunther, Cat. Batr. Sal. Brit. Mus., 1858, p. 57 (type locality "Mexico").

Bufo levifrons Brocchi, Bull. Soc. Philom. Paris, ser. 7, vol. 1, no. 4 1877, pp. 187-188 (type locality "Mexico").

Material Examined. Eight specimens of which three are from a locality 17 kilometers ESE of Mexico City, D. F.; the others are from a locality 23 kilometers east of Mexico City; all specimens are in the Texas Cooperative Wildlife Collection. Descriptions including pertinent data are available for specimens from Durango and Chihuahua (Kellogg, 1932:47), and from several other unspecified localities (Boulenger, 1882:302; Gunther, 1901-246; Brocchi, 1882:70; Gunther, 1858:57; Dugès, 1888: 140). No description—these or others—fail to agree with the characters discerned in the specimens.

Distinguishing Characteristics.—Three features distinguish this from its northern relative: (1) the venter is dark spotted; (2) warts on dorsal surface rougher, tips hardened; and (3) dorsal spots small, numerous. Furthermore, the cranial crests are better developed.

All specimens examined are spotted below; there is some variation (spots faint in one, small in two, large in others), but the spots are evident in all. Similar marks are recorded by Kellogg for Durango and Chihuahua specimens; Wiegmann's type of *B. compactilis* is said to have them (Kellogg); Gunther describes them in his type of *B. anomalus;* Brocchi figures them for his type of *B. levifrons;* and Dugès describes them in specimens from Guanajuato and Distrito Federal. No other descriptions that mention ventral markings have been found. All evidence available indicates that the southern specimens uniformly possess dark-spotted bellies. This would distinguish them from northern specimens (U. S. and northeastern Mexico), which apparently have the belly unspotted or with a few tiny dark flecks.

In all specimens examined the dorsal surface is profusely warty and the warts possess hardened tips; the combined effect is a rather bristly one. Kellogg similarly describes specimens from Durango and Chihuahua, and Taylor and Smith (1945:556) indicate a similar condition in their specimens from the environs of Mexico City. In the latter paper, however, it is stated that three specimens "from Michoacán have the pustules and

intervening skin somewhat less rough" than the preceding. The character is not mentioned by other authors. Northern specimens have fewer, lower and scarcely spinose warts.

All specimens examined have small, irregularly placed, dark dorsal spots. Brocchi similarly depicts the type of *B. levifrons;* the character is not adequately treated in the other sources cited. Northern specimens have a fairly constant pattern of a pair of rather large spots between and behind the parotoids, and a smaller pair halfway down the back. It should be mentioned that the figure given by Mertens (1930:155) of a specimen from Cerro de Ixtapalapa, México, agrees more fully in pattern with the U. S. specimens.

There is an apparent difference in degree of development of the cranial crests, which are fairly prominent in the Mexican specimens, more reduced in the U. S. material. The difference is not sufficiently concrete to warrant detailed comparison, and is subject to some variation according to method of preservation. United States specimens, often described as lacking crests, actually possess reduced ridges scarcely apparent in live and well preserved material, but unmistakable in shrunken specimens. While reduced in the entire species the crests cannot in truth be said to be completely absent in adult specimens. Kellogg (1932:32, 45, fig. 8) well characterizes the actual condition.

Synonymy. Chiefly upon the basis of ventral spotting *B. compactilis, B. levifrons,* and *B. anomalus* are considered synonymous. If there is indeed a geographic segregation (at least partial) of the two forms here recognized, as it now appears, the probable source of the types of the above species supports the allocation indicated by ventral pattern. The type of *B. compactilis* was taken by Deppe and Schiede, all of whose materials apparently were taken from central and southern Mexico. The type of *B. levifrons,* probably collected by Dugès, very likely was taken in central Mexico. The type of *B. anomalus* was purchased from a professional dealer, Parzudaki; its derivation is very likely the environs of Mexico City but definite clues are not apparent.

Range. The main Mexican Plateau from its southern edge in Puebla and Jalisco northward to Chihuahua and perhaps to adjacent New Mexico and western Texas; on the east possibly to central Nuevo León.

Bufo compactilis speciosus Girard
Northern Sonoran Toad

Bufo speciosus Girard, Proc. Acad. Nat. Sci. Phila., vol. 7, 1854, pp. 85-87 (type locality Rio Bravo [Rio Grande del Norte] and New Leon [Nuevo León]).

Bufo compactilis speciosus Cope, Bull. U. S. Nat. Mus., no. 34, 1889, p. 273.

Bufo mexicanus Brocchi, Bull. Soc. Philom. Paris, ser. 7, vol. 3, no. 1, 1879, pp. 23, 24 (type locality "Mexico").

Material Examined. Fifty-five specimens, all from Texas and in the Texas Cooperative Wildlife Collection and that of Bryce C. Brown: 2 from Grant and 1 from 12 miles NW of College Station, Burleson

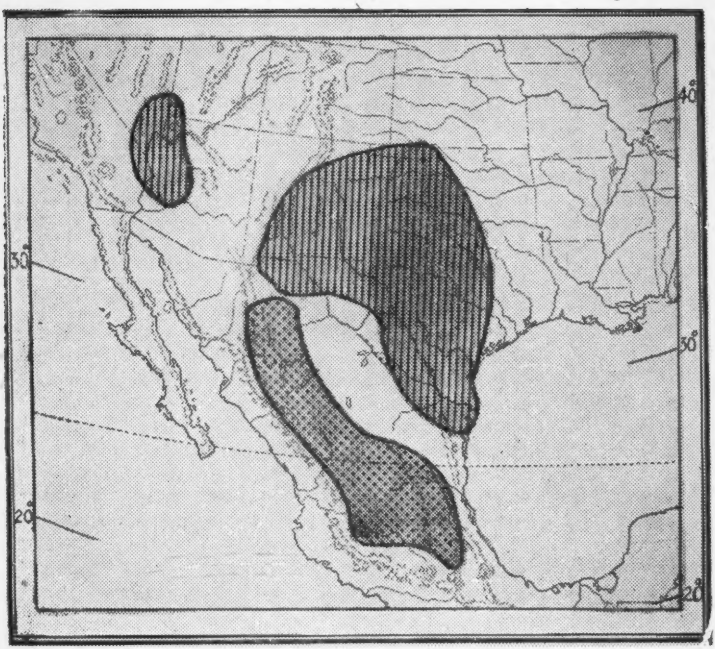

FIG. 1. Approximate distribution of *Bufo compactilis*. Dots indicate the range of *B. c. compactilis;* vertical lines that of *B. c. speciosus.*

County; 6 from 6 miles NE of Alice, Jim Wells County; 14 from 8 miles SW of Victoria, Victoria County; 2 from Holland, Texas Dam, and 1 from Cotulla, La Salle County; 2 from 22 miles S of Junction, Edwards County; 12 from Harlingen, Cameron County; 1 from Lake La Joya near Mission, Hidalgo County; 1 from Austin, Travis County; 2 from Armstrong, Kennedy County; 6 from Millican, Brazos County; and 5 from Rockport, Aransas County. These agree in pertinent characters with descriptions in Cope (1889:272); Slevin (1928:98); Linsdale (1940: 205); Wright and Wright (1933-60); and Dickerson (1908:120).

Distinguishing Characters. The chief distinguishing characteristics are (1) total or near-total absence of ventral markings; (2) absence of spines on the warts; and (3) presence of a fairly well-defined pattern of dorsal spots. The cranial crests are very low and poorly defined.

All specimens examined lack ventral spots of any sort save 3 from Harlingen which have 1 to 6 flecks in a small area at the center of the anterior portion of the chest. All descriptions cited above mention the

same feature; no reference to specimens from the U. S. with ventral markings have been seen. These sources combined include specimens from most extremes in the range of the U. S., including Texas, New Mexico, Utah, Nevada, and "Kansas."

Most warts on the specimens examined lack cornified tips and all are low and rounded. This characteristic is one that has received frequent comment, for the effect is similar to that of a *Scaphiopus*.

Specimens examined have a pair of dark spots on the shoulder between and slightly behind the level of the parotoid glands; usually another smaller pair of spots is present halfway between the preceding spots and vent. Similar markings are depicted by Wright and Wright.

The cranial crests seem definitely lower, less distinct and less tuberculous in U. S. specimens.

Synonymy. Chiefly on the basis of ventral markings *B. speciosus* and *B. mexicanus* are considered synonymous. The figures of one of the cotypes of the former given by Baird (1859:pl. 40, figs. 5-10) and that of the type of *B. mexicanus* by Brocchi (1882:pl. 8, fig. 3) leave no doubts as to absence of ventral markings.

Cope's suggestion that *B. speciosus* might be a valid race of *compactilis* was based upon the differences in the development of the cranial crests, presumably much as here indicated. He states: "I suspect that the cranial characters belong to a race which ranges farther north than the true *Bufo compactilis,* which may at some time be regarded as a subspecies, under the name of *B. compactilis speciosus.* The true *B. compactilis* occurs in southwestern Texas, and ranges as far south in Mexico as the Isthmus of Tehuantepec." I know of no other indication of the occurrence of *B. c. compactilis* in the U. S.; since specimens are known from Chihuahua, however, it may well occur in adjacent New Mexico and possibly Texas.

Another name often referred to the synonymy of *Bufo compactilis,* and which would be placed with *B. c. speciosus* on the basis of the absence of a ventral pattern, is *Anaxyrus melancholicus* Tschudi (1845:78-79, pl. 11, fig. 5). In fact if the two names were considered synonymous the latter would take priority *(melancholicus,* 1845; *speciosus,* 1854).

The identity of *A. melancholicus* is difficult to determine. Depending upon the nature of the preconcept, the name can be held as based either upon a distinct species or upon *B. compactilis.*

Previous authors who have treated the name, beginning apparently with Boulenger (1882:302), have universally placed it with *B. compactilis.* This fact is, in reality, the chief reason for so allocating the name at the present time. Yet there is no evidence that any of these authors saw the type or had otherwise gained any information regarding it not available in the original description.

Now that the identity of *A. melancholicus* is of actual concern in establishment of the name for an animal, it is of prime importance to reconsider all pertinent evidence. There are two reasonably probable conclusions: (1) that the name is based upon the northern race of *B. compactilis,* and (2) that it is based upon a distinct Peruvian species.

Lines of evidence indicating that *A. melancholicus* is based upon a Peruvian species are:

1. Precise statement of type locality by the author, who was—most significantly in this connection—also the collector. Tschudi (p. 79) says: "We found this species only once in the Province of Yauyos, Department of Lima, about 4000 feet above sea level, under a stone." If the habitat data were recorded from memory, then there is little chance that the nature of the specimen would have been so obscurely recalled that an exchange with North American material would reasonably have been accepted by Tschudi unnoticed. If on the other hand they were recorded from field notes an unobserved exchange could reasonably have occurred.

2. The nasal openings are said to be half-moon shaped. Actually they are flattened ovoids in *B. compactilis.*

3. There are no elongate papillae in *B. compactilis* at the rear of the tongue as described for Tschudi's type.

4. In *B. compactilis* the fore legs reach not only to (as in *A. melancholicus)* but past the groin, to as far as the middle of the hind leg insertion.

5. The large palmar tubercle is not "heartshaped" in *B. compactilis* as described in *A. melancholicus.* It is nearly egg-shaped.

6. The hind leg reaches considerably beyond the tip of the snout in *B. compactilis;* actually the tip of the 3rd toe is about opposite the tip of the snout as the hind limb is adpressed to the sides of the body. Tschudi says that only the tip of the longest toe reaches the snout tip in *Anaxyrus.*

7. The figure shows a very short hind leg, and one in which the 1st, 2nd, and 5th toes are of nearly equal length. In *B. compactilis* the 1st toe is much shorter than the 2nd, and the 5th is only slightly shorter than the 3rd.

8. The tympanum as shown in the figure is smaller than in *B. compactilis.*

9. The iris is depicted as bright red; not so in *B. compactilis.*

10. No pattern whatever is indicated on the back. *B. compactilis* actually is distinctively marked above.

The only lines of evidence indicating that *A. melancholicus* is identical with *B. compactilis* are:

1. Features not mentioned in the preceding list fit *B. compactilis.*

2. No toad found in Peru has been observed to fit Tschudi's description.

3. Most if not all the apparent discrepancies between the description or figure of *Anaxyrus* and *B. compactilis* can be attributed to inaccurate description and poor draftsmanship.

Not to prolong unduly a controversial matter, it is obvious that Tschudi's other figures are drawn properly so far as relative toe lengths are concerned; pattern is reproduced where it occurs; he had seen the specimen in life, and might well have remembered a red iris.

I am not wholly certain that Tschudi's name is inapplicable to some Peruvian anuran now known by another name. It apparently is no species known to Boulenger in 1882, and of the some 14 other Bufos described from Peru and adjacent territories since 1882 I have been able to check

all but 6 and regard them definitely not involved. There are several species known in Peru, however, which lack cranial crests; some have a white belly, a few warts, and small parotoids much like Tschudi indicates. That his species may be one of these is not improbable. There is also of course the possibility that the name could apply to some anuran other than a species of *Bufo*.

Since so many facts seem to indicate that conspecificity of *B. compactilis* and *A. melancholicus* is very doubtful, use of the latter name for a northern race of the former may at present be considered unwarranted. In the event that the name is regarded as a *nomen dubium* its rejection herewith as a synonym of *B. speciosus* may perhaps obviate allocation with it. True it is that Boulenger as first reviser placed the name with *B. compactilis*, but he did so in error; if it were a northern form at all it would be *B. speciosus* (subspecificity has no bearing). Only by reexamination of the type or complete elimination from possibility of all Peruvian species, apparently, may it be possible to synonymize *B. speciosus* and *A. melancholicus*. In the latter event the race would be known as *Bufo compactilis melancholicus* (Tschudi).

Range. Northern Nuevo León northward to northern Oklahoma and probably southwestern Kansas, westward to southern Nevada and through most of Arizona except the southwestern corner.

Conclusions

Scattered evidence strongly indicates that at least two forms of *Bufo compactilis (auct.)* are recognizable. For geographic and other reasons they are tentatively regarded as subspecies: *Bufo c. compactilis* Wiegmann the southern race, and *B. c. speciosus* Girard the northern race. *Anaxyrus melancholicus* Tschudi is rejected as a synonym of *B. compactilis*.

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Microhyla carolinensis in Kansas

By HOBART M. SMITH

A specimen of *Microhyla carolinensis* (Univ. Kans. Mus. Nat. Hist. No. 24414) collected 4 miles east and ½ mile north of Baxter Springs, Cherokee County, Kansas, on April 27, 1947, by Edward P. Beasley, provides the first record of this species from the state of Kansas. This record, from the extreme southeastern corner of the state, extends the known range of the species but a short distance northwestward from southwestern Missouri and northwestern Arkansas.

The specimen is an adult female in perfect condition, 34.5 mm. snout to vent. The lower surfaces of the entire body and limbs are, as typical of the species, heavily pigmented except in small, profusely scattered, more or less rounded, pigmentless spots. The dorsal surface is dark, brownish-slate, with portions of an irregular dorsolateral dark streak on each side of the middorsal line. The middorsal area between these streaks is not darker than the areas lateral to them.

The nearest geographical approach of specimens at hand of *Microhyla* is represented by UKMNH No. 9904, from 12 miles southwest of Oswego, Labette Co., Kansas. This is typical *M. olivacea,* lacking all ventral pigmentation (except on the vocal sac) below, and with a lighter, almost spotless dorsum.

Although conspecificity of *M. carolinensis* and *M. olivacea* has been suggested (Hecht and Matalas, Nov. Amer. Mus. Nat. Hist., no. 1315, 1946), observations made in Texas in 1946 by Bryce Brown and me do not support the theory of intergradation. In the vicinity of College Station, *M. olivacea* began breeding two or three weeks earlier than *M. carolinensis.* In many areas one species occurred to the exclusion of the other, but in some both were found. The breeding periods overlapped, so that in the latter areas both species were heard calling at the same time. A difference in pitch, volume, intensity, and length of calls

was apparent. Furthermore the specimens themselves, of which we secured considerable numbers, never showed a variation that would suggest even slightly the occurrence of intergradation.

This evidence, I believe, indicates rather strongly that the separate specific status of *M. olivacea* and *M. carolinensis* is still reasonably probable. The evidence presented by Hecht and Matalas for intergradation rests chiefly upon variation in a series (from Victoria, Texas) of long-preserved specimens, and upon another series from Latimer Co., Oklahoma. Field observations in these and other critical areas and where the ranges of these forms overlap or are contiguous are to be considered essential as confirmation before accepting as valid the inference of intergradation.

A peculiar variation in some Missouri *M. olivaceus* is of interest. There are two (UKMNH Nos. 16851-2) from 4 miles northeast of Independence, Jackson County, Missouri, in which the dark pigment extends in scattered patches onto the sides of the belly and lower lips; in addition a few flecks are present on the middle of the chest.

The significance of this variation is not immediately obvious. It may well be only the extreme in the rather marked north-south cline in dorsal color tone, which becomes darker to the north, lighter to the south. Or it may represent an approach toward *M. carolinensis.*

Because of the observations in Texas, the marked differences between the species at the same locality or closely situated localities (in Texas and in Kansas respectively), and the possibility of the apparent *olivacea-carolinensis* cline actually being an intrinsic and independent cline of *olivacea,* it appears reasonable to retain for the time being the view that *M. olivacea* and *M. carolinensis* are distinct species.

Opisthoglyph Terminology *By* HOBART M. SMITH

Stickel (Proc. Biol. Soc. Wash., vol. 56, 1943, pp. 109-128) has recently pointed out the existence of a compact, natural group of American genera of opisthoglyph snakes characterized by, among other features, the possession of grooves on the sides instead of the front of the rear teeth. These teeth he appropriately termed pleuroglyph. Thus two types of rear fangs in snakes are to be distinguished: (a) a front-grooved type, and (b) a side-grooved type.

Unfortunately the terms generally used for these two groups are not compatible. Pleuroglyph, applied to type "b," refers to the position of the groove on the tooth. If the other type were named on a like basis, it would be called the proglyph type. "Opisthoglyph," in reality, refers only to the presence of grooved teeth in the rear of the mouth, irrespective of the nature or position of the grooves on the teeth. Both types "a" and "b" are, then, more properly considered opisthoglyph, and each type should be regarded as a subdivision of the morphological (not natural) group Opisthoglypha.

It is suggested that snakes of type "a" be called pro-opisthoglyph, and those of type "b" be considered pleuro-opisthoglyph.

Feeding Behavior of *Tropidoclonion lineatum*

By L. W. RAMSEY

It is often impossible to make observations in the field upon the manner in which a number of our small secretive snakes feed, and observations made upon captives are frequently worthless because some snakes refuse to feed while captive and others drastically change their diet. But, with snakes that will take food while captive, it may be possible in some cases to obtain interesting and valid information about their natural behavior from a study of their behavior while feeding in captivity. Of course, such a study should include the habits of the animal that is preyed upon as well as those of the predator. It is supposed that a species of snake that feeds heavily in nature upon a certain kind of prey will acquire a specialization of habit in feeding that is adapted to the animal fed upon. This will be especially true if the food animal is of such type as to require a special adaptation in order to be preyed upon successfully. When captive specimens accept such food, it is supposed that they will instinctively follow the acquired pattern in disposing of it. Observations upon the feeding behavior of captive specimens of *Tropidoclonion lineatum* seem to indicate a high degree of specialization in feeding upon earthworms and the natural habits of earthworms are such as to lead to this kind of specialization.

These little snakes have small heads that are not capable of as much expansion in proportion to their size as are the heads of many other snakes. They are secretive and nocturnal in their habits and are able to burrow to some extent. They have been observed prowling about at dusk and at ten o'clock at night. During the day they may be found hiding under stones, boards, tar paper, piles of leaves or other rubbish. Earthworms are available to them and they are known to eat them in nature. Miss Force[1] has reported finding individuals eating earthworms, and the writer has found their remains in several stomachs.

A number of captive specimens have been observed during the past two years, but most of the observations used here were made during the past year on one juvenile and two adult specimens. These were well suited for such observations because they fed well and were tame. Some of the others remained wild and were not good feeders. But, when food was accepted, the behavior of the snakes was essentially the same in all cases.

Several of the snakes were tested by being offered small grasshoppers, crickets, snails, sow bugs, and a number of kinds of insect larvae. The snakes showed interest only in earthworms. Grasshoppers, in particular, caused the snakes to try to hide their heads underneath their bodies. But small grasshoppers that had been killed and smeared with the fluid from chopped earthworms were eagerly seized by two of the snakes. One ate the grasshopper but the other snake disgorged hers after partially swallowing it. The same two snakes ate grub worms and raw beef that were

[1]Edith R. Force: "Habits and Birth of Young of the Lined Snake, *Tropidoclonion lineatum*." Copeia: 1931, July 20, No. 2. pp. 51-53.

smeared with earthworm fluid but would have nothing to do with this kind of food unless it was so smeared.

All of the shelters were removed from the cages when the snakes were being fed, and the worms were introduced by dropping one worm near each snake. They were usually fed during the evenings at intervals of two days. Each snake was allowed all of the worms that it would eat. The largest specimen (a female about 13 inches long) usually ate three good sized worms, sometimes four. Although the length of an earthworm is a debatable matter, it is estimated that this specimen ate from seven to ten inches of worms at a meal. The procedure most frequently followed by these snakes while feeding is described below for one of them.

As soon as a worm was placed in the cage, the snake showed interest. This was indicated by raising the head slightly and peering about, and by frequently flicking out the tongue. If the worm moved, the snake found it more quickly. As soon as the worm was located, the snake moved cautiously toward it and proceeded to examine it carefully. When the examination was finished, the snake slowly pushed its head forward until it was practically in contact with the middle of the worm. Then, with a quick forward thrust, the snake seized the worm and withdrew its head, with the worm, for perhaps half an inch. The worm immediately began to twist and wriggle and to exude a considerable amount of slime. Small worms were quickly swallowed without much further movement by the snake. Regardless of size, however, all worms that had been seized on the body were gradually worked into the snake's mouth from both sides. This caused the worm to be doubled up, hairpin style, as it went down. None of the snakes showed any variation from this manner of swallowing a worm that had been seized on the body.

After finishing the meal, the snake proceeded to remove the slime from its head by rubbing on the walls or floor of the cage. Sometimes the snake would go into the water dish and rub its head, submerged, along the sides of that vessel.

If it had seized a larger worm, the snake at once began to cast about with its tail and rear portion of its body. If a stone or other heavy article were placed within the snake's reach, it immediately wrapped about the object. This reaction suggested that the snake expected to have a tug of war with the worm and was seeking a means of anchoring itself. This was demonstrated in several instances when the worm had been able to get part of its body into a crack in the floor of the cage before being seized. If the snake had no means of anchoring itself, the worm could pull it forward and work more of its own body into the crack. But if a stone or other object were provided, the snake could nullify most of the efforts of the worm. This reaction persisted, however, even if the worm had not gotten itself into a crack. But in the latter case the result was for the snake to move backwards, dragging the worm about the cage. In two instances, one of the snakes managed to back up the wall of the cage and hook its tail over the top. It then pulled itself up and finished swallowing the worm while hanging head down from the side of the cage.

Worms frequently wrapped themselves about the snake's head when seized. If the worm became too tightly wrapped, the snake proceeded to remove it by rubbing against the wall or floor of the cage. In nearly every case observed, the head was rubbed backwards. This tended to move the worm forward, into a better position for swallowing.

This procedure was not always followed, however. Perhaps the most common variation was to curtail the preliminary investigation of the worm. Lively worms seemed to excite the snakes more than others. In some cases, a very lively worm was seized without any investigation. Occasionally a snake was seen to strike at a particularly lively worm from a short distance, perhaps less than an inch. If the worm was crawling along the floor, the snake usually followed it for a short distance and then moved up parallel to the worm until its head was near the middle of the worm's body. Then, with a quick side thrust of its head, the snake seized the worm. However, in a number of such instances, the snake simply reached out and seized the worm by the tail. But, when seized by the tail, the worm escaped in most cases by rolling or twisting its body and pulling itself apart at the line of the snake's teeth, leaving its tail in the snake's mouth. This maneuver always happened very quickly.

Sometimes a snake was given a worm that was too large to be doubled up, hairpin style, when being swallowed. In such a case, the snake seemed to struggle along for five or ten minutes or longer when the worm suddenly became severed at one of the snake's jaws. The portion of the worm retained by the snake was then swallowed endwise. Under such circumstances, the severing of the worm by the snake seemed more or less accidental, brought about by the repeated efforts of the snake to work the worm further into its mouth. As the effort was continually applied to the same part of the worm, the effect was gradually to saw it in two. The sharp, recurved teeth of the snake are not adapted to biting a worm in two, and it is doubtful if the snake has enough strength in its jaws for such action. In several instances, a snake was observed to abandon a very large worm after working on it for some time. A juvenile specimen, having seized a worm much too large for it, was found to have it almost severed after about ten minutes. It might be that these snakes have some ability to direct this cutting action because the effort seemed frequently to be concentrated on one side. One specimen, having eaten about all of the worms that she could, was given another. She swallowed part of it and then cut off the rest by rubbing against the floor. Afterwards, she showed no interest in the retreating remnant of the worm.

The snakes were quite adept at retrieving worms that had gotten into cracks. They frequently managed to secure the entire worm. In two cases, when a worm had gotten into a crack that was particularly favorable to it, the snake swallowed as much of the worm as it could and then, after a short delay, severed the worm even with the floor.

An interesting correlation can be established between the known habits of earthworms and the manner in which these snakes seize and manipulate

them while feeding. Unless the weather is very dry, earthworms frequently emerge from their burrows during the evening, except for the tip of the tail which remains anchored in the burrow. After showers they leave their burrows at night in large numbers to travel about over the surface. These little snakes are most active during the evening, too, and it is very probable that they do most of their feeding then.

An earthworm lying outside of its burrow, but keeping its tail securely anchored within it, can withdraw out of sight very quickly if disturbed. This reaction of the worm will call for at least three reactions on the part of the snake that feeds upon it. The first has to do with the point of seizure. The captive snakes have been observed most frequently to seize the worm near or slightly posterior to mid-body. In nature, seizure at this point would effectively prevent the anterior portion of the worm from getting back in the burrow. If seized too far forward, the worm could get more of its body back into its burrow. The second has to do with the reaction of the snake to seek a place of anchorage for itself as soon as the worm is seized. With adequate anchorage, the snake could prevent most of the posterior part of the worm from retreating into its burrow. Of course, the anchorage would have to be found very quickly, but under most natural conditions it probably would be readily available. The third reaction has to do with the manner in which the worm is swallowed. Most snakes swallow elongate prey endwise, but these snakes very rarely swallow an earthworm that way. To do so would mean that the snake would have to work its jaws to one end of the worm before beginning to swallow it. This would cost the snake some of the advantage it had gained in point of seizure and finding anchorage for itself. The most effective procedure would seem, therefore, to begin swallowing the worm at once by working it into the mouth from both sides, thus doubling it up. This brings out another reason for not seizing the worm on or in front of the clitellum, for this is the strongest part of the worm. Snakes that had seized a worm at this point were noted to have more difficulty in swallowing it than if seizure were made on the middle third of the worm's body.

These three reactions, and especially the last two, are so pronounced as to suggest that in nature perhaps most of the worms eaten by these snakes are seized with the tail still in the burrow. Of course, all of the reactions described above would still result in advantage to the snake if it seized the worm while it was entirely out of its burrow. It would not do, for instance, for the snake to seize the worm by the tail, for besides its ability to pull itself in two, the worm could secure its release by depositing excrement in the snake's mouth. This was observed in two instances and, after releasing the worm, the snake did not again attack it until it had cleared the excrement from its mouth.

The foregoing suggests strongly that captive specimens of *Tropidoclonion lineatum,* when feeding upon earthworms, display a procedure that is uniquely adapted to feeding upon such prey in nature.

Herpetology of Crystal Lake, Sullivan County, N.Y.

By HOWARD E. EVANS

The following records were compiled after summer collecting from June to August in 1937, 1938, 1939 and 1942 at Camp Manhattan, Sullivan Co., N. Y. The camp is located on Crystal lake which is part of the 10,000-acre tract of the Boy Scout Foundation of Greater New York. This area is in the western portion of Sullivan county between White lake and Narrowsburg. I made a concentrated effort to collect in the surrounding area with the help of 600 or so scouts.

The terrain is characterized by many wooded ridges with exposed rocky ledges sloping down through open fields and a wet meadow. The lake shore is rocky and wooded with a few small tributary streams and with a sphagnum bog that connects with it. On the east side of the lake is a high rocky bluff at the base of which is the shaded entrance to the rattlesnake den, pictured by Ditmars (The Reptile Book 1907 p. 430).

All specimens except the smaller ones were killed by injecting 5% formalin into the body cavity and preserved in 3% formalin. The collection is deposited in the American Museum of Natural History, Cornell University and the Camp Manhattan Museum.

In order not to destroy the entire population, many nearby areas were not collected, the young, born in captivity, were released and the other scout camps in the vicinity liberated all their captives at the end of the summer.

SPECIES COLLECTED

Bufo a. americanus Holbrook.—45 specimens. These toads were of large size, the young ones rarely being caught. Four pairs were found calling and copulating on the ninth of June along the shores of Crystal lake.

Bufo fowleri Hinckley.—13 specimens. The typical pattern of these toads included several reddish uniform warts in each dark spot.

Hyla crucifer Wied.—33 specimens. The swamps bordering the lake were the favorite habitat of these frogs.

Hyla v. versicolor (Le Conte).—5 specimens. All individuals were caught either in the apple orchard or under loose bark of piled logs at the sawmill.

Rana catesbiana Shaw.—107 specimens. The loud bullfrog chorus makes me believe their numbers were considerable. Due to the sphagnum swamps they lived in, collecting was very difficult. One of the most successful methods to catch them was to place a piece of red cloth or a red leaf on a fish-hook and dangle it in front of them. A fondness by the campers for frog's legs made their number at the museum small.

Rana clamitans Latreille.—65 specimens. Often found in moist woodland and along the lake shore.

Rana palustris LeConte.—860 specimens. This is by far the most often caught frog in the area. It is very common in the wet grassy fields near the lake shore.

Rana pipiens Schreber.—34 specimens. The leopard frog inhabited the same areas as did *Rana palustris* but was much less abundant.

Rana sylvatica Le Conte.—57 specimens. An inhabitant of the wooded hillside and very commonly the apple orchard.

The variety of salamanders is poor, only six species being found. The sixth, *Pseudotriton r. ruber,* was found under a board on a wet hillside 3,000 yards from the nearest stream. I record it as doubtful since I was told that a scout released one the previous summer 2,000 yards from the spot where this specimen was found. No other specimens have been taken.

Triturus v. viridescens (Rafinesque).—8,650 immature (efts), 1,300 mature. After a heavy rain the red efts could be found everywhere in the camp area, particularly in the heavy woodlands. If an effort were made to collect more of these salamanders the figure could be easily doubled. One scout, on a bet, would eat red efts wrapped in a piece of bread with no ill effects. Very dark efts were often found but none had the well-developed tail of the adult. One April, I observed many pairs of adults in amplexus in the shallow waters of the lake in the area of Nitella, Chara and eel grass.

Ambystoma maculatum (Shaw).—8 specimens. All these salamanders were found in the same moist wooded locality, under logs. They were all over five inches long.

Plethodon cinereus (Green).—17 specimens. The dark phase outnumbered the red backed phase.

Plethodon glutinosus (Green).—3 specimens. Found on the same hillsides as the dusky and red-backed salamanders, under rotted logs.

Desmognathus f. fuscus (Rafinesque).—10 specimens. Found on wet hillsides under rocks.

Diadophis punctatus edwardsii Merrem.—28 specimens. These snakes seemed to prefer the drier hillsides usually in rocky areas. A few of the individuals had the ventral spotting typical of southern forms.

Heterodon c. contortrix Linnaeus.—3 specimens. Of the three specimens caught, two of them, one adult and one immature were melanistic, showing very little of their typical pattern.

Opheodrys v. vernalis Harlan.—31 specimens. Many of the captive individuals laid fertile eggs which were easily incubated in sawdust. The adults refused to eat in captivity. Some of them when caught would strike with closed mouths at the hand holding them.

Elaphe c. obsoleta Say.—18 specimens. Many more specimens were seen but not caught. They inhabited the wooded areas. One individual was caught twenty feet up in an oak tree. A captive female laid twelve fertile eggs. The habit of captive individuals of vibrating the tail and hissing was often observed.

Lampropeltis t. triangulum Lacepede.—12 specimens. Milk snakes were most often caught along the rocky lake shore or around rock piles in exposed fields.

Natrix s. sipedon Linnaeus.—227 specimens. The shores of Crystal

Lake and its adjoining swamps were always a sure collecting spot. Occasionally one would be found high up on the wooded hillside in the territory of the black snakes.

Storeria occipitomaculata Storer.—50 specimens. These individuals were found in groups of three or five under rocks and logs on exposed fire lines. The black and red phases were equally abundant.

Storeria dekayi Holbrook.—4 specimens. The few specimens found were under the same rocks as the red-bellied snakes.

Thamnophis s. sirtalis Linnaeus.—625 specimens. Many more garter snakes could have been collected. They were being brought in every day but facilities for keeping them were limited. A marking study was started early one summer by clipping scales (Blanchard, Ecology, Oct. 1933) of twenty-six specimens, but the returns were poor. There were only seven individuals recaptured by the end of the summer. Two were recaptured at place of original capture and release; one was recaptured where released, 5000 yards from original capture; one returned from a distance of 2000 yards.; and three, transported 2000 yds. were recaptured at other places.

Thamnophis s. sauritus Linnaeus.—16 specimens. The ribbon snakes were brightly marked with yellow lateral stripes. One captive specimen gave birth to sixteen young.

Agkistrodon m. mokasen Beauvois.—1 specimen. A preserved individual in the camp museum was presumably taken in camp but I have never seen any in the area.

Crotalus h. horridus Linnaeus.—22 specimens. Found in rocky brush areas, and fireline rock ledges. The lakeside den that Dr. Ditmars pictures has been searched frequently but only two specimens were taken. The caretaker has been blasting it in the spring with the hope of killing off the remaining population.

Eumeces faciatus (Linnaeus).—7 specimens. Four other individuals eluded capture. They were all found on rock walls at the lakeside or on the rock walls around the museum building.

Chelydra s. serpentina (Linnaeus).—7 specimens. Most common in the muddy ponds that drain into Crystal Lake. An egg laying site used year after year is an old sawdust pile a few thousand yards from the lake. In August 1939, twenty-nine eggs were dug out of the three-foot-high pile. They were buried one and a half feet deep.

Chrysemys p. picta (Schneider).—32 specimens. This turtle was common in Crystal Lake and could always be seen in the areas of pond lily.

Clemmys guttata (Schneider).—2 specimens. From mud pond, a pitcher plant bog draining into Crystal Lake.

Clemmys insculpta (LeConte).—3 specimens. All of these specimens were large males found near ponds.

Sternotherus odoratus (Latreille).—13 specimens. These algae-covered musk turtles were caught in Crystal Lake and the ponds adjoining it.

New Members

Mr. Lawrence Curtis, 4145 Normandy St., Dallas 5, Texas.
Dr. Carl Edelstam, Karlav 9, Stockholm, Sweden.
Mr. Howard E. Evans, Dept. Zool., Cornell U., Ithaca, N.Y.
Mr. Fred G. Evenden, Jr., 521 Hayes St., Woodburn, Ore.
Mr. George S. Fichter, Box 5215, State College Sta., Raleigh, N.C.
Mr. Saufley B. Friddle, Kearneysville, W.Va.
Mrs. Elsa Gilles, 4789 Pearl Road, Cleveland 9, Ohio.
Mr. Rickie Harness, 2828 Madison Ave., San Diego 4, Cal.
Mr. J. H. Hoofien, Anglo-Palestine Bank Ltd., Tel-Aviv, Palestine.
Mr. Rodney B. Johnson, 123 Great Oak Lane, Pleasantville, N.Y.
Mr. Friedrich Kenneweg, 23 Bremen 8, Glucksburgestrasse 6, Germany, Amer. Zone.
Mr. Ernest A. Liner, Box 215 Southwestern, Lafayette, La.
Mr. John G. Lyon, 225 W. Cedar St., Ravenna, Ohio.
Mr. Larry Moehn, Green Valley, Ill.
PFC. R. C. MacEwan, Co. "A," 2d Amph. Trac. Bn., 2d Mar. Div., Camp Lejeune, N.C.
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Mr. C. Wm. Nixon, Dept. Zool., U. of Ill., Urbana, Ill.
Mr. E. R. Parizy, 10 Rue d'Avron, Gagny, Seine et Oise, France.
Mr. Malcolm V. Parker, Berclair Sta., Memphis 12, Tenn.
Mr. Jack Quarters, 2915 W. Phila. Ave., Detroit 6, Mich.
Mr. Bucky Reeves, San Diezo Zoo, Balboa Park, San Diego, Cal.
Mr. Richard L. Reinhardt, 27 Arnold St., Buffalo 13, N.Y.
Mr. Harold L. Rosenthal, 13 Cypress Ave., New Brunswick, N.J.
Mr. Jay M. Savage, 1344 Fremont St., San Jose, Cal.
Mr. Philip W. Smith, Natl. Hist. Survey, Nat. Resources Bldg., Urbana, Ill.
Mr. Kjell von Sneidern, Dir. N.H.M., U. of Cauca, Popayan, Colombia, S.A.
Mr. Paul S. Stokely, Dept. Biol., U. of Notre Dame, Notre Dame, Ind.
Mr. Alfred Verwyst, 1018 Leland Ave., Dayton, Ohio.
Mr. John E. Werler, Staten Id. Zool. Soc., West Brighton, S.I., N.Y.
Mrs. Grace Olive Wiley, 4582 Lincoln Blvd., Cypress, Cal.
Mr. Weldon D. Woodson, 118 South Ave., 24, Los Angeles 31, Cal.

Changes of Address

Dr. John P. Craig, Grace-New Haven Community Hospital, 789 Howard Ave., New Haven 4, Conn.
Dr. Henry S. Fitch, 909A Verone Terrace, Leesville, La.
Mr. W. E. Haast, Miami Serpentarium, Kendall, Fla.
Dr. Sherman A. Minton, Jr., 1733 N. Meridian St., Indianapolis, Ind.

Mr. Earl C. Martin has been elected a Fellow of the Herpetologists League.

Natrix rigida in Texas

By BRYCE C. BROWN

Natrix rigida (Say) has long been thought to range into eastern Texas. Over twenty years ago Strecker (Contr. Baylor Univ. Mus., no. 4, 1926, p. 9) recorded the striped water snake in western Louisiana within a few miles of the Texas border and suggested that this species might occur in Texas. Again in 1928 (Contr. Baylor Univ. Mus., no. 16, p. 17) he pointed out the occurrence of this snake in adjacent states and mentions that *rigida* had not actually been captured in Texas, but that he believed that he had seen it in Bowie County. Specimens of *rigida* are now extant from several widely separated localities a considerable distance within the eastern boundary of Texas. The fact that this snake had not definitely been recorded from Texas is not surprising as the striped water snake is known to be secretive in habits.

The first *Natrix rigida* to come to the writer's attention was collected late on the night of April 6, 1946, on the spillway at Normangee Lake, Normangee State Park, Leon County, Texas. This specimen (BCB[1] No. 3511) is a male with a total length of 518 mm. and a tail length of 132 mm.; scale rows 19-19-17, ventrals 132, caudals 65, supralabials 7, infralabials 10, oculars 2-2, temporals 1-2. Its color above is darker than that usually described for *rigida,* being so dark that the lateral lines are barely discernible. Additional Texas specimens of the striped water snake, agreeing well in color and scale characters with No. 3511, have been examined from Normangee State Park (TCW[2] No. 1499, Robert Singleton, collector), from 12 miles west of Jasper, Jasper County (TCW No. 1500, H. W. Fields, collector), from 7 miles east of Athens, Henderson County (BCB Nos. 3487-88, Ottys Sanders, collector), and from 4 miles west of Silsbee, Hardin County (BCB No. 3784, B. C. Brown, collector).

COLLEGE STATION, TEXAS.

[1]BCB—Bryce C. Brown Collection, College Station, Texas.
[2]TCW—Texas Cooperative Wildlife Collection, College Station, Texas.

A Range Extension for *Crotalus m. molossus* B. & G. in Texas

By BRYCE C. BROWN AND M. B. MITTLEMAN

Several records now available prove that *Crotalus molossus molossus* actually extends some one hundred miles north of New Braunfels, Comal County, which has hitherto been known as the northeasternmost locality for the species (*fide* Gloyd, Sp. Pub. Chi. Acad. Sci., 1940, 4:157). Several specimens of the black-tailed rattler have been collected at Rough Creek, eight miles east of San Saba, San Saba County, Texas, by Mr. Ed Johnson. One of these, a female, was taken in May, 1937, and is now in the Strecker Museum (No. 6474) at Baylor University. Another specimen collected in September, 1946, will be deposited in the Chicago Academy of Science.

A fine specimen of *Crotalus molossus molossus* is extant, which closely approaches the maximum reported size. This individual, a male, meas-

ures 1135 mm. from the snout to the base of the rattle. It was taken by Dr. Spurgeon Smith at Longhorn Cavern State Park, Burnet County, which is notable because this locality is also north of the previous limit of this species' range. The specimen is now in the collection of the San Marcos State Teachers College.

COLLEGE STATION, TEXAS, and NEW ROCHELLE, N. Y.

REPTILES AND AMPHIBIANS OF THE NORTHEASTERN STATES. By Roger Conant. Published by the Zoological Society of Philadelphia, 1947, 41 pp., 123 illus., $1.00—This "is a non-technical résumé of the snakes, lizards, turtles, frogs, toads, and salamanders" of the area treated. Roger Conant, the author of this timely booklet, needs no introduction or recommendation to readers of *Herpetologica.* He is well-known for his scientific studies and his popular accounts of amphibians and reptiles, as well as for his capable editorship of *Fauna,* the quarterly magazine of the Zoological Society of Philadelphia.

Geographically the area covered includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, the eastern half of New York, New Jersey, eastern Pennsylvania, Delaware, and eastern Maryland. At the front of the booklet a map clearly outlines the area, including the major physiographical features. Faunistically it contains all of the species and subspecies of amphibians and reptiles known to occur in this region, with the exception of the marine turtles and of introduced species. Counting subspecies, this list consists of 27 snakes, 6 lizards, 16 turtles, 20 frogs, and 18 salamanders.

The introduction provides a brief orientation for the beginner, and acknowledgement of those who have contributed material assistance. This is followed by a check list of all forms, together with their known distribution. The remainder of the pamphlet consists of the separate sections treating snakes, lizards, turtles, frogs, and salamanders, with sections on the treatment of snake bite, the care of captive specimens, and a list of references for those who wish to probe beyond the scope of the present work. There is an index.

The sections dealing with the different groups are subdivided into a brief general account of the more important features of the group and the species accounts with illustrations of all species. Among the outstanding features of this work are the distinctive photographs of live specimens that illustrate *every* species that is included. These have been planned and executed so as to illustrate the important features of each species, as well as the young of many of the turtles. The process of assembling such an excellent set of photographs certainly entailed considerable time, patience, and expense.

Conant has been eminently successful in producing a highly readable, scientifically accurate treatise which fills a long felt need of the herpetologist, amateur and professional alike, for a single reference work covering the entire amphibian and reptile fauna of the northeastern states.—JAMES A. OLIVER, *American Museum of Natural History.*

The Sagebrush Swift in Pasture Insect Control[1]

By GEORGE F. KNOWLTON

Studies of the sagebrush swift, *Sceloporus graciosus graciosus* (Baird and Girard), have shown it to be a very important factor in range insect control in many parts of Utah. It doubtless is equally important in various other parts of the West. This lizard was observed to occur in abundance among rabbitbrush, *Chrysothamnus nauseosus,* and to invade nearby grass and weed areas of an uncultivated sandy pasture west of Orem, in Utah County, Utah. Lizards were collected by means of a .22 rifle using shot shells. The abdominal cavity of each lizard was opened and the entire specimen preserved in alcohol for later microscopic study of the stomach contents. Stomach examinations were made in the research laboratories of the Utah Agricultural Experiment Station, at Logan. Lizard collections were made as follows: 133 *graciosus* specimens collected on August 22 and 65 on September 13, 1932; 43 on June 15 and 79 on September 14, 1933; 28 on July 7 and 162 on July 27, 1934, or a total of 510 stomachs available for this study. All specimens were collected on an area of less than one acre. The total collecting time was approximately six hours. M. J. Janes assisted the writer with the collecting on four of the six stops, which averaged about one hour each.

Recognizable insect food consisted of the following: 250 Orthoptera, of which 4 were true crickets, 1 a longhorned grasshopper, the rest being ordinary shorthorned grasshoppers; 9 Neuroptera, 2 belonging to the aphid lion family; 5 dragonflies and damselflies; 2 thrips; 424 Homoptera, 6 being spittle insects, 100 leafhoppers of which 14 were beet leafhoppers, 4 fulgorids, 2 psyllids, 306 aphids and 3 mealybugs; 128 Hemiptera, 10 being the injurious *Lygus hesperus* Knight, 53 Lygaeidae of which 13 were false chinch bugs and 10 *Geocoris decoratus* Uhler big-eyed bugs, and 9 pentatomid stink bugs.

One hundred and thirty-seven beetles still were in recognizable condition, among them 24 larvae, 71 ground beetles, 16 rove beetles, 1 wireworm, 13 ladybird beetles, 30 darkling beetles, 23 scarabaeid beetles, many being of injurious species, 24 leaf beetles, together with 14 weevils; 1 Trichoptera; 214 Lepidoptera of which 178 were larvae; 792 Diptera of which 22 were larvae, 583 being chironomids all but five of which were present in stomachs collected on July 27, 1934, 1 mosquito, 4 horseflies, 2 bombyliid flies, and 6 chloropids; 3405 Hymenoptera, 6 being ichneumonids, 9 chalcidids, 2 chrysidids, 3,224 ants, largely *Pogonomyrmex occidentalis* (Cresson) and *Formica* spp., 3 vespid wasps and 1 sphecid wasp, 3 andrenids and 6 honeybees. Numerous unidentified insect fragments also were present in many of the stomachs.

In addition to the insects listed above, 48 spiders, 38 mites, 1 symphyllid, 3 scorpions, 3 parasitic roundworms, 1 snail, 1 approximately one-half grown *S. g. graciosus* lizard (besides a few plant fragments and seeds which probably were ingested accidentally) also were recognized.

[1]Read June 17, 1947 at the meeting of the Herpetologists League in its joint session with the American Association for the Advancement of Science, San Diego.

Publication Dates of Kelaart's Prodromus Fauna Zeylanicae

By DR. EDWARD H. TAYLOR

One of the great rarities in libraries is a publication that appeared in the island of Ceylon more than 90 years ago. It is of considerable importance to systematists, since it contains original descriptions of reptiles and amphibians.

Modern writers almost invariably assign wrong dates to this publication. Vol. I contains: Part III. Ceylon reptiles, pp. 139-187; descriptions of *Uropheltis sp* (?), *Hemidactylus pieresii* and *Gymnodactylus kandianus* are given. Part IV. Ceylon amphibia. pp. 189-197; type descriptions of *Rana newera-ellia* and *Polypedates stellata.* There follow appendices with new pagination, pp. 1-54, in which two letters appear, dated November 22 and December 16, 1852, and "The Catalogue of Birds" taken from the January, 1853, issue of the Jour. Ceylon Asiatic Soc. which makes it certain that the book was not published in 1852.

Part I only, of Vol. II was published, containing the Synopsis of Ceylon Reptiles by Dr. E. F. Kelaart, pp. 5-10. Descriptions of New or little known Reptiles, also by Kelaart, pp. 11-22. The species are: *Acontias* (?) *Layardi, Rhinophis Blythii, Uropeltis Saffragamus, U. grandis, U. Pardialis, Dapatnaya Lankadivana, D. Trevelyana, Rana Kandiana, Limnodytes Mutabilis, L. maculata, Eumeces Taprobanensis,* and *Polypedates* (?) *Schmardana.*

The inscription on the cover is 1854, but on the title page it is dated 1853. The back of this page bears: "From the Jour. of the Asiatic Soc. of Ceylon, 1853." The implication being that the contents came from that journal, which, of course, is incorrect. The date, 1854, of the outer cover is the correct one, since descriptions of three new frogs appear on pp. 22-23 which are said to have been published as late as 1854 in the Journals of the Asiatic Soc. of Bengal.

Volume I was almost certainly published in 1853 and Vol. II in 1854.

Kelaart considered the Prodromus as a serial, since articles appeared under various titles by him or others. Therefore individual titles should be quoted as separate items.

Kelaart was born in Ceylon from Dutch colonists. He was educated in England, appointed staff surgeon at Gibraltar in 1841; later transferred to Ceylon. He died in 1860.

UNIVERSITY OF KANSAS, LAWRENCE, KAN.

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"Pacific Division, American Association for the Advancement of Science, California Academy of Sciences, San Francisco, Cal., July 25, 1947. Office of the Secretary. The Herpetologists League is now an Associated Society of the Pacific Division and entitled to one representative on its Council. Unless some other person is specifically designated by a society the Secretary is the representative of that society on the Council. (signed) Robert C. Miller, Secretary."

Snakes Collected at Camp Eastman, Hancock County, Illinois

By DAVE A. LANGEBARTEL

During the summers of 1944-45-46, while serving as nature instructor at Camp Eastman, Illinois, a number of snakes came to my attenion. This hilly camp of 137 acres, of which over 100 acres are heavily forested, is located on U. S. route 96, midway between Hamilton and Nauvoo, Illinois, on the banks of the Mississippi River. It is bounded on one side by the river; by a wide mouthed creek called an inlet on another side and the other two sides by farmland and woods.

No venomous snakes were seen or reported during the three summers, but a farmer who had lived nearby for fifty years related having killed two "copperheads." He was doubtless mistaken as to the species.

Summary of the species taken:

Carphophis amoena vermis (Kennicott). A puzzling specimen was collected at 10 p.m. on July 17, 1945, crossing a forest path. It made no attempt to bite, altho it repeatedly pushed the spiny scale on the end of its tail against my hand. Its total length 290 mm.; internasals and prefrontals not joined into two large shields; one temporal behind first; pink of belly extended upon first three scale rows for 13 scales behind head, thence gradually descending to the second row; dorsum shiny black. In summarizing the above characteristics, it is quite possible this is an intergrade with *helenae*.

Coluber constrictor flaviventris (Say). One adult 986 mm. was taken June 16, 1945; two blotched juveniles and a young adult 1946; stomach of one juvenile contained a mature cricket, *Gryllus* sp.

Diadophis punctatus arnyi (Kennicott). Two specimens taken in 1944, eleven in 1945 and two in 1946, mostly under small objects on the ground. Largest specimen, 381 mm. Two specimens bore the abdominal markings characteristic of *edwardsii,* but the location is too far west for that subspecies. On July 23, 1945, one deposited five eggs averaging 27 mm. long; June 30th, 1945, another laid one egg. All eggs spoiled except one which was opened 16 days after being laid. It contained a 51 mm. embryo.

Elaphe obsoleta obsoleta (Say). Fourteen specimens collected, thirteen of which were adults—nine in 1945 and five in 1946. The largest adult measured 1490 mm.; the remainder averaged about 1217 mm. One juvenile, of 350 mm. had a light background with dark dorsal blotches. Two were found in trees; one a very thin specimen, was high in a sugar maple tree, where a pair of screaming blue jays drew my attention. The birds had a nest in the tree and the obviously hungry serpent had possibly been driven from the nest by the jays, at any rate he was being driven from the tree. The second specimen was found in a small elm where it had just swallowed three young orioles from a nest. The 1490 mm. specimen swallowed a dead cottontail rabbit 160 mm. long in twenty minutes. These snakes presented a pretty sight when swallowing such large prey, the light colored skin contrasted against the dark scales ap-

peared as broad lines. The skin color in most examples was pinkish-orange or milk-white. Captive specimens were generally uncertain in temperament.

Heterodon contortrix contortrix (L). Two small, light colored specimens taken in August, 1944, in dense woods where one played "possum."

Lampropeltis calligaster (Harlan). One captured August, 1944; another of 802 mm. on July 13, 1945.

Lampropeltis triangulum triangulum (Lacepede). One large, heavy-bodied adult taken August, 1944.

Lampropeltis triangulum syspila (Cope). Two specimens collected at the camp, June, 1945, about 606 mm. long; dorsal blotches very red.

Intergrade between *L. t. triangulum* and *L. t. syspila.* Taken July 9, 1946; length 959 mm.; 33 brown dorsal blotches extending to first or second scale rows; small lateral blotches alternating with dorsal blotches giving a ringed appearance when viewed from above. The large size, brown colored blotches and lateral blotches are common to *triangulum,* whereas the extension of the dorsal blotches to the first and second scale rows and the 33 dorsal blotches are characters of *syspila.*

Natrix sipedon sipedon (L). Seventeen specimens collected and many more of various sizes were seen about the river and inlet. The largest, taken on the night of June 26, 1946, in the inlet, measured 920 mm. It contained 24 well developed and nearly completely colored embryos; six of them averaged 154 mm. Of many small specimens, five averaged 350 mm. Small specimens were found under bark resting on a mud flat.

Storeria dekayii wrightorum Trapido. One specimen, 326 mm. long taken June 24, 1945, in marshy grassland near the inlet.

Storeria occipitomaculata occipitomaculata (Storer). A single small adult, 178 mm. long, was captured on June 19, 1945, swimming about ten feet from the bank in the inlet. It had a very red belly.

Thamnophis sirtalis parietalis (Say). Ten collected; largest 775 mm.; smallest 183 mm., taken July 30, 1946. All had red on the skin, particularly anteriorly and the anterior scales were tipped with dark red; lateral yellow stripes on second and third scale rows.

Northwestern Herpetology Contributions

By DONALD DARLING

Contia tenuis. Out of twenty-three specimens collected near Corvallis, Oregon, six contained gastropods. The number of slugs was from one to five and they were from four to eight millimeters in length. Species was not determined.

Diadophis amabilis occidentalis. Seven specimens collected near Lebanon, Oregon. The four largest were 53 cm. to 60 cm. in total length. They contained a snake skin; the posterior portion of Thamnophis ordinoides 10 cm. in length; the posterior portion of Thamnophis ordinoides 12 cm. in length; a snake skin; complete tail and pelvic girdle of Eumeces skiltonianus 4.2 cm. in length. From these observations it appears probable that the Western Ring-neck snake closely parallels the Eastern in feeding habits.

Range of *Pituophis m. melanoleucus* Restricted

By WILFRED T. NEILL

According to Stull, the eastern pine snake, *Pituophis melanoleucus melanoleucus* Daudin, ranges from New Jersey southward to the Carolinas, while the related *P. m. mugitus* Barbour has not been taken far north of the Florida border (1940, U. S. Nat. Mus. Bull. 175). Thus, although the forms have been accorded subspecific rank, the contiguity of their respective ranges has not been demonstrated.

In a previous article I recorded the characters of six pine snakes from the Fall Line area of the Georgia-South Carolina border (Copeia 1, 1941: 56). These specimens, mostly intermediate in details of squamation, exhibited both *melanoleucus* and *mugitus* coloration. The series suggested intergradation between the two races. Recently I have found pine snakes to be fairly common at Tahoma and McBean, Richmond County, and Green's Cut, Burke County, Georgia. These Coastal Plain examples display the pallid coloration, immaculate head and venter, higher average scale count, and increased number of ventrals and subcaudals characteristic of *mugitus*.

The habitat of the form in this region is a restricted one, consisting of arid, dusty expanses of white sand, overgrown with broom-sedge, witch-grass, prickly-pear, and dog-fennel, and with occasional patches of scrubby oaks and a scattering of long-leaf and loblolly pines. This type of terrain supports a few characteristic animals, the most conspicuous of which is a pocket-gopher *(Geomys)* whose tunnels riddle the sandy soil. The burrows of small, gray mice, presumably *Peromyscus* sp., were frequently noted, and the nests of eastern ground doves *(Columbigallina)* were several times encountered. *Pituophis m. mugitus* and *Heterodon simus* were the only snakes observed, both species being common. *Cnemidophorus sexlineatus* was the only lizard seen. The pine snakes frequented *Geomys* burrows, into which they attempted to retreat when approached. One snake had swallowed a large pocket-gopher, and the remains of these rodents were also found in four other stomachs examined.

Harper mentions brown-pied *Pituophis* from Thomas and Charlton Counties, Georgia, and Lexington County, South Carolina, the last locality being very near the Fall Line (1940, Amer. Midl. Nat. 23, No. 3: 718-719). Brimley records a pine snake, probably *mugitus,* from Baker County, Georgia (1910, Proc. Biol. Soc. Wash. 23: 14). I now record the southern race from the upper Coastal Plain, and have discussed probable intergrades with *melanoleucus* from Fall Line areas of Georgia and South Carolina. Typical *melanoleucus* has been taken in Pickens County (Pickens, 1927, Copeia 165: 111) and Oconee County (Stull, *op. cit.:* 59), South Carolina. Both of these localities are in the Piedmont, from which region Corrington mentions yet another specimen (1929, Copeia 172: 74). I have collected it at Wylie, Rabun County, Georgia, in the Appalachian province. These records fall into a familiar pattern, a mountain and Piedmont form meeting a Coastal Plain form at the Fall Line. A complication is introduced by Rea's account of a brown-pied

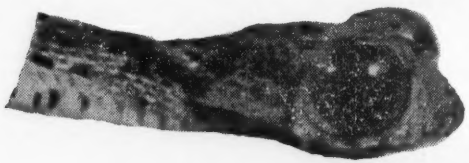
specimen from Walhalla, Oconee County, and a black-pied one from Charleston, Charleston County, South Carolina (1910, Bull. Charleston Mus. 6: 47). However, Stull diagnosed a Walhalla specimen in the Clemson College collection as typical *melanoleucus,* and indicated that a second Oconee County example had been so classified by Franklin Sherman (Stull, *op. cit.:* 59-60). While it can scarcely be doubted that black-pied pine snakes occur in the pine barrens of the Middle Atlantic states, I believe that an extension of the range of *P. m. melanoleucus* throughout the entire Coastal Plain of South Carolina, solely on the basis of the Charleston specimen, is not warranted at the present time.

AUGUSTA JUNIOR COLLEGE, AUGUSTA, GEORGIA

An Abnormal Condition in the Transparent Spectacle of a Coast Gopher Snake

By JOSEPH R. SLEVIN

A specimen of the Coast Gopher Snake *(Pituophis catenifer catenifer)* which was received by the writer showed a most abnormal condition of the transparent spectacle covering the eye, and no doubt of such a rare occurrence that it may be considered worthy of record.



An abnormal eye condition in *Pituophis c. catenifer.*

This snake, a female, from Philo, Mendocino County, California, measured fourteen inches in length. When received the spectacle over the eye was somewhat milky, though not as opaque as during the shedding process. With the aid of a binocular magnifier the eye was plainly visible and appeared to be deeply set in the head. On further examination this was found to be true, the eyes not extending beyond the edge of the frontal. The scales surrounding the eye appeared to be pushed out of position by the enlargement of the spectacle and formed a sharp ridge around it.

The spectacle itself was 6 mm in diameter and its center 5 mm. distant from the eye.

Toxicity of Heloderma Venom

By WELDON D. WOODSON

It is now established that the Arizona Gila monster *(Heloderma suspestum)* and the Mexican Gila monster *(H. horridum)* are poisonous. This conclusion was not reached, however, without much debate, and even to this day there are questions still left unsettled.

The early day students of these lizards radically differed in their reports. John Edward Gray in 1857 said that it was not definitely proved that the bite of the Mexican Gila monster is poisonous. Dr. B. J. D. Irwin in 1862-1863 tested the Gila monster's bite upon some fowls near Tucson, Arizona, but they did not die. In contrast, Dr. Gunther in 1882 stated that there can be no doubt as to the poisonous bite of *H. horridum*. In the same year Sir Joseph Fayrer claimed that experiments demonstrated that the bite of *Heloderma* is poisonous.

In 1883, Doctors S. Weir Mitchell and Edward T. Reichert induced Gila monsters to bite upon a saucer's edge. They injected hypodermically the secretion into frogs, rabbits and pigeons. The animals died within a few moments. Previous experimenters in the main had had the live lizard to bite the subject, which raised the question as to whether death was actually due to lacerations. Mitchell and Reichert concluded that the Gila monster must be classified with the poisonous creatures of the world.

In the succeeding years there were numerous tests which confirmed the conclusion that both species are venomous. In 1913, Leo Loeb, in collaboration with others, issued a report based upon extended investigations into the properties and toxic action of the venom of these lizards undertaken at the request of Dr. Mitchell. They reviewed the findings of others and disclosed their own experiments. They pointed out that these reptiles lack hollow fangs like that of a rattlesnake. Instead, certain teeth in both the upper and lower jaws are grooved. Poison glands are located at the base of only the lower ones, however. When they bite, the venom may be forced up through the grooves, mixes with the saliva and enters into the wound made by the teeth.

It was also determined that the poison is principally a neurotoxin, and that when proving fatal to small animals death is due to respiratory failure. It was found that a variety of warm-blooded mammals are susceptible, but cold-blooded vertebrates, as the toad, are much less sensitive. It was further observed that these lizards are resistant to their own venom.

The establishment of these facts, however, still leaves unanswered the problem as to the effects of their bite on man. The author at the start of an extended investigation of these lizards a number of years ago learned that there had been no serious effort to collect case histories. The recounting of a half a dozen or so seemed to be the extent of the contribution of any single investigator. So he pried through well over 600 bibliographical references, corresponded with more than a hundred doctors and got in touch with a like number of "old-timers." Further, he sent ques-

tionnaires to the heads of the reptile houses of zoos in the United States, as well as the leading naturalists of Mexico and many of our own country. Finally, he personally interviewed victims of Gila monster bite.

In all, 136 *Heloderma* case histories were collected. Twenty-nine ended in death. The symptoms included excruciating pain, nausea, paralysis, edema, perspiration and convulsions. Several factors should be taken into consideration when studying the symptom picture. When biting an individual, they hold on with bulldog tenacity. Their sharp teeth curve slightly backwards, and each pull causes them to sink in deeper. In regard to the Arizona Gila monster, the "old-timers" were accustomed to say that the only way to break its hold is to chop off its head with a sharp hand axe. It is therefore obvious that the bite, itself, can cause a severe, lacerated wound.

Furthermore, it is highly probable that often very little, if any, of the poison actually enters the wound. Since the poison sacs are located in the lower jaw and the venom must be forced up and into the wound by the awkward contrivance of minute grooves in the teeth, the poison may merely spill over the gums and never enter the cuts. This contrasts unfavorably with the hypodermic equipment situated in the upper jaw of the rattlesnake. The Gila monster sometimes remedies its faulty mechanism by chewing the flesh, thus working the envenomed saliva into the wound. It has been reported that it may also wrench its body around in an upside-down position so that the venom flows down.

And there are still other factors to take into account. The poison has a quantitative effect and therefore is likely to prove more dangerous to a child than an adult. The aged and sickly individuals are more susceptible to the poison than a person in his prime or the well in body. Fright may contribute to the ill effects, so it is advisable for one to keep cool should he be bitten. The lack of a proper cauterizing agent may result in the wound becoming infected. It has been shown that the saliva contains injurious properties other than the venom from the glands. This may account for the oft-reported rapid appearance of swelling and hemorrhagic discoloration of the skin at the site of the bite.

A significant problem concerns the great percentage of deaths: 29 out of 136 cases. The potency of Gila monster venom, drop for drop, is much less than that of rattlesnake, cobra, black widow spider or other highly virulent creatures. Laboratory experiments show that the Gila monster to cause death in a normal healthy human being would need to introduce at least a half a cubic centimeter of venom into the wound in the process of biting. This seems improbable owing to the lack of a hypodermic mechanism, much of the poison being wasted even under the most favorable conditions.

The probability that much of the details of the fatal cases are erroneous, or entirely fictitious, can be illustrated by a contemporary case. The author in his correspondence has received six letters that refer to the victim. One writer tells of the bite, and, in conservative details, charts the symptom picture, whereas another explains that it took place on the

nose and disfigured the man for life. The remaining four ranged between these two extremes.

To learn the truth, the author sent a questionnaire to the man, himself. His reply most certainly vouched that his reported symptoms were greatly exaggerated. "My Gila monster bites were of little consequence," he writes. "None of the bites were serious. Just snatch them off and you would not even have to kiss the place. Iodine or something like that is cheap, and of course any fresh cut should be taken care of."

In conclusion, it should be emphasized that there is little likelihood of this lizard deliberately inflicting itself upon a human being. It becomes exceptionally gentle when taken out of its native habitat and placed indoors. This docility nevertheless accounts for most of the bites, for persons have become careless and been bitten when heedlessly sticking their hand too near the reptile's powerful jaws.

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The Purpose, Aims and Policy of HERPETOLOGICA

Herpetologica was established for the purpose of:

1. Prompt publication of beginners' papers.
2. Concentration of herpetological papers under one cover.
3. Publication of herpetological titles with annotations, that have appeared in journals which would ordinarily be missed by herpetologists.
4. Close cooperation with every publication, institution and person interested in any phase of herpetology.

It is therefore bewildering to receive a letter from a "Curator of Reptiles and Amphibians" of one of our leading museums stating: " . . . I have always opposed the idea of (Herpetologica) because the bane of zoology is its scattered literature; instead of making more journals we should reduce their number. I do not have a complete set, (of Herpetologica) nor do I know what numbers I have paid for and, frankly, I do not care."

Herpetologica fortunately has a large following of loyal supporters. For instance: "I am interested in life membership in the Herpetologists League . . . Jacob Goetz." We had to inform Mr. Goetz that Life Memberships would have to wait until some institution takes over the responsibility for Herpetologica and the Herpetologists League.

REVISION OF THE AFRICAN LIZARDS OF THE FAMILY GEKKONIDAE. By Arthur Loveridge.

January, 1947. Bull. Mus. Comp. Zool., Harvard University, 98(1): 1-469, pls. 1-7.

This is another in the already imposing series of well-executed monographs by Mr. Loveridge on the herpetology of Africa. In this, 16 pages are devoted to introductory material, 48 pages to a bibliography of 654 works concerned with African geckos, 9 pages to an index and the remaining 396 pages to keys and descriptive material. There is an introductory key to genera, and with each generic discussion a key to the species and subspecies of that genus. Twenty-eight genera are treated, and for each genus a synonymy, diagnosis, statement of range, and usually miscellaneous pertinent facts ("remarks") are cited. Each of the 204 discussions of species or subspecies includes a synonymy, and material organized under the headings of description, color, size, remarks, localities, range, and often also native (or other) names, sexual dimorphism, habitat, habits, diet, parasites, defense, enemies, temperament, aestivation, folklore, anatomy, longevity, breeding, hibernation, and perhaps others as well.

This work is a compendium of all previously published information on the African geckos. References are made to material not otherwise included. To this is added descriptive and other information derived from Mr. Loveridge's long experience in the field and from the actual specimens (largely resulting from his own field work) now in the Museum of Comparative Zoology. Much new material which defies brief summary is included.

The introduction briefly outlines the economic value of geckos; lists the nomenclatural changes proposed in the work; cites a few very brief but very noteworthy comments on habits and morphology; diagnoses the family (in which he includes Boulenger's Uroplatidae and Eublepharidae); and terminates with a table summarizing the geographical distribution of the African genera by countries and provinces.

Few if any other recent works summarize such a large natural group for such an extensive natural area. The book's extensive scope combined with its manifestation of Mr. Loveridge's characteristic, thorough and careful treatment, effectively weld another important step toward a modern summary of the African herpetofauna. Zoogeographic considerations, which some readers will miss, have appropriately and commendably been deferred to a later time when all herpetological data can be available at once and the implications more readily and accurately interpreted.—HOBART M. SMITH, *Department of Zoology, University of Illinois, Urbana.*

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THE HERPETOLOGISTS LEAGUE meets jointly with the Ecological Society of America under the auspices of the American Association for the Advancement of Science, at Chicago, Dec. 29-31, 1947. Those able to attend or wishing to submit papers to be read, please contact your Secretary immediately. Deadline, Oct. 15th.

Recent Herpetological Literature No. 4

Compiled by ALBERT G. SMITH

Baker, C. L.
1947. The species of Amphiumae. Jour. Tenn. Acad. Sci., 22, no. 1: 9-21, 8 figs. Jan. 1st.

Baker, C. L., Louise C. Baker, and Mabel Caldwell
1947. Observation of copulation in Amphiuma tridactylum. *Ut supra:* 87-88.

Baldauf, Richard J.
1947. *Desmognathus f. fuscus* eating eggs of its own species. Copeia, no. 1: 66. Apr. 20.

Ball, Howard A.
1947. Melanosarcoma and rhabdomyoma in two pine snakes (Pituophis melanoleucus). Cancer Res., 6, no. 3: 134-138, 10 fig. Jan.

Barth, L. G. and J. Jaeger
1947. Phosphorylation in the frog's egg. Physiol. Zool., 20, no. 2: 133-146. April 1.

Blair, Albert P.
1946. The effects of various hormones on primary and secondary sex characters of juvenile Bufo fowleri. Jour. Exp. Zool., 103, no. 3: 365-400, 32 figs. Dec. 1.
1947. Field observations on spadefoot toads. Copeia, no. 1: 67.

Breder, C. M., Jr.
1946. Amphibians and reptiles of the Rio Chucunaque drainage Darien, Panama, with notes on their life histories and habits. Bull., Amer. Mus. Nat. Hist., 86, no. 8: 375-436, 18 pl., 25 figs.

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1946. The thermal factor in evolution. Jour. Entom. and Zool., 38, no. 4: 49-54. Dec. 1.

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1947. Restitution of the brachial region of the cord following unilateral excision of the embryo. (Ambystoma). Jour. Exp. Zool., 104, no. 1: 53-68, 10 figs. Feb. 1.

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Hamilton, Rodgers D.
1947. The range of *Pseudemys scripta gaigeae*. Copeia, no. 1: 65-66.

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1947. *Eumeces fasciatus* in northern New York. Copeia, no. 1: 64.
Heilbrunn, Lewis V., and Floyd J. Wiercinski
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Hilton, William A.
1946. The skeletons of Siren and Pseudobranchus. Jour. Entom. and Zool., 38, no. 4: 56-58, 2 fig. Dec. 1.
Holtfreter, Johannes
1947.1. Observations on the migration, aggregation and phagocytosis of embryonic cells. Jour. Morph., 80, no. 1: 25-56, 17 figs. Jan. 1.
1947.2. Changes of structure and the kinetics of differentiating embryonic cells. *Ut supra:* 57-92, 29 figs.
Gloyd, Howard K.
1947. Some rattlesnake dens of South Dakota. Chicago Nat., 9, no. 4: 87-97, ill. Jan. 1.
Karczmar, Alexander G.
1946. The role of amputation and nerve resection in the regressing limbs of urodele larvae. Jour. Exp. Zool., 103, no. 3: 401-427 9 figs. Dec. 1.
Lane, H. H.
1946. A survey of the fossil vertebrates of Kansas. Part III. The reptiles. Trans. Kansas Acad. Sci., 49, no. 3: 289-332, 7 figs. Dec. 1.
Mittleman, M. B.
1947. Geographic variation in the sea snake (*Hydrophis ornatus* Gray). Proc. Biol. Soc. Wash., 60: 1-8. April 3.
Oliver, James A.
1947. The status of *Leptophis* Bell. Copeia, no. 1: 64.
Parker, F., S. L. Robbins and A. Loveridge.
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1946. A note on the caudal kink of reptilian embryos. Spolia Zeylonica 24, pt. 3: 193-194, 1 pl. Nov. 8.
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1947. Studies on a population of snakes in Illinois. Copeia, no. 1: 6-22, 10 figs.

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1946. The effect of different concentrations of nicotinic acid amide on the work output of perfused frog muscles. Amer. Jour. Physiol. 146, no. 1: 52-55. Dec. 1.

Singer, Marcus
1947.1. The nervous system and regeneration of the forelimb of adult Triturus. VI. A further study of the importance of limb innervation. Jour. Exper. Zool., 104, no. 2: 223-249, 13 figs. March 1.
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1947. Observation of behavioral development in the loggerhead turtle (Caretta caretta). Science, 104, no. 2694: 154-156. Jan.

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Stebbins, Robert C.
1947. Tail and foot action in the locomotion of *Hydromantes platycephalus*. Copeia, no. 1: 1-5, 2 figs.

Stewart, George D.
1947. A record for Muhlenberg's turtle. Copeia, no. 1: 68.

Stokely, Paul S.
1947. The post-cranial skeleton of *Aprasia repens*. Copeia, no. 1: 22-28, 3 figs.

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1947. The effects of certain denatured organs on neuralization in *Amblystoma* explants. Physiol. Zool., 20, no. 1: 32-45, 1 pl. Jan. 1.

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1947. The terrestrial form of the newt, *Triturus viridescens*, in the Chicago region. Nat. Hist. Misc., no. 5: 1-3. Jan. 17.

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1947. The Mohave rattlesnake in Utah. Copeia, no. 1: 66.
Wright, Margaret R.
1947. Experiments on the lateral line system of anurans. Proc. Sco. Exper. Biol. and Med., 62, no. 2: 242-243.

UNIVERSITY OF PITTSBURGH, PA.

Dr. Charles Haskins Townsend

By CHAPMAN GRANT

Charles Haskins Townsend was born in Parnassus, Pennsylvania, in 1859. His whole life was devoted to science, mostly on the sea. His foundation was laid while employed at the Ward establishment. Who's Who tells us that he was with the Acad. Nat. Sci., Phila., 1882-83; secured his ScD. at Washington and Jefferson in 1909; Assistant in the U.S. Fish Commission, 1883; USS "Corwin" Arctic Expedition, 1885; USS "Albatross," 1886-96; Chief, Div. Fisheries, U.S. Fish Commission, 1897-1902; Director, N.Y. Aquarium, 1902-32; U.S. Fur Seal Commission, 1896-1907; Fishery Expert, Russo-American Arbitration, the Hague, 1902; Acting Director, American Museum, 1910-11. Dr. Townsend passed away in 1944.

It was while working as his assistant at the Aquarium from 1910 to 1913 that I had the privilege of associating with this remarkable man. He was ornithologist, ichthyologist and general scientist; writer, engineer and practical all-round jack of all trades and master of many, not the least of which was the ability to make friends with everyone with whom he came in contact. Dr. Townsend had the good fortune, from a herpetologist's point of view of having been the first to visit many tropical islands where every reptile he met was undescribed. He took full advantage of his opportunities and although not a herpetologist he has left a herpetological record very worthy of note.

The National museum has the types of the following reptiles named in his honor: *Amphisbaena townsendi* Stejneger; *Anolis townsendi* Stejneger; *Oedipus townsendi* Dunn; *Sauromalus townsendi* Dickerson. *Sphaerodactylus townsendi* Grant, type at U. of Mich.

The following list of Dr. Townsend's herpetological papers may be incomplete:

1887 (1888) Field notes on the mammals, birds and reptiles of northern California. Proc. U.S.N.M., Vol. 10, pp. 159-241, Pl. 5.

1889 Reptiles from Clarion and Socorro Islands and the Gulf of California with descriptions of a new species. Proc. U.S.N.M., Vol. 13, pp. 143-144.

1911 Transplanting turtles. N.Y.Z.S. Bull., No. 16, p. 812.

1916 Voyage of the "Albatross" to the Gulf of California in 1911. Bull. Am. Mus. Nat. Hist., Vol. 35, art. 24, pp. 399-476, figs. 1-45.

DR. CHARLES HASKINS TOWNSEND

1924 New information on the Galapagos tortoises. N.Y.Z.S. Bull., Vol. 27, No. 4, pp. 89-91, 1 fig.

1925 The Galapagos tortoises in their relation to the whaling industry. A study of old log books. Zoologica, Vol. 4, No. 3, pp. 55-135, figs. 20-32.

The whaler and the tortoise. The Sci. Monthly, Vol. 21, No. 2, pp. 166-172.

1926 Items of interest: The size of the leatherback turtle. An old tortoise. Reptiles and amphibians (a review). N.Y.Z.S. Bull., Vol. 29, No. 6, pp. 217-219.

1928 A double turtle. N.Y.Z.S. Bull., Vol. 31, No. 1, pp. 35-36, 4 figs.

Propagation of the giant tortoise in the United States. Science, Vol. 68, No. 1750, p. 30.

The Galapagos Islands revisited. N.Y.Z.S. Bull., Vol. 31, No. 5, pp. 148-169, 34 figs.
Giant tortoise finds that man is friendly. N. Y. Times, May 20.

1930 The Astor expedition to the Galapagos Islands. N.Y.Z.S. Bull., Vol. 33, No. 4, pp. 135-155, figs.; also p. 170.

1931 Growth of Galapagos tortoises. N.Y.Z.S. Bull., Vol. 34, No. 6, p. 180, 1 fig.
Growth and age in the giant tortoise of the Galapagos. Zoologicia, Vol. 9, No. 13, pp. 459-474, figs. 357-368.

1932 Galapagos tortoises in Bermuda. N.Y.Z.S. Bull., Vol. 35, pp. 121-123.
A portrait of Holbrook, naturalist, 1796 - 1871. N.Y.Z.S. Bull., Vol. 35, No. 4, p. 137.

1936 Cruelty to baby turtles. N.Y.Z.S. Bull., Vol. 39, No. 1, pp. 41-42, 2 figs.
Two giant tortoises were swept twenty miles by hurricane. N.Y.Z.S. Bull., Vol. 39, No. 3, pp. 119-120, 2 figs.

1937 Growth of Galapagos tortoises, *Testudo vicina,* from 1928 to 1937. Zoologica, Vol. 22, No. 19, pp. 289-292, 1 pl.
No date—Care of turtles and small alligators. N. Y. Aquarium Information Circular, No. 3. 3 pp.

1942 Can we save the giant tortoise? Animal Kingdom, Vol. 45, No. 5, pp. 109-111, 3 figs.

Excerpts from "Lacerta," herpetological monthly of the Netherlands

Vol. 5, Nos. 8, 9, 10. May, June, July 1947. Vier Heemskinderen Str. 159, The Hague, Holland.

p. 63. A Reyst. Habits of *Agama stellio.*

p. 64. Miss E. M. Lups. 1½ years pregnancy of spotted salamander.

p. 64. P. Maeder. Food of *Lacerta ocellata.*

p. 67. Th. Cornelissen. *Hyla arborea,* complete discussion.

p. 71. J. Kan. Discussion of International nomenclatorial rules.

p. 78. A. Reijst. *Bufo marinus,* discussion.

p. 79. W. Deutz. Strength of *Coluber viriflavus.*

p. 80. Object and methods of the Herpeto-geographical service.